

and the earth's heliocentric longitude being $15^{\circ}3$, the inferior conjunction of the assumed intra-Mercurial body with the sun would have occurred on the morning of Stark's observation.

THE FOURTH COMET OF 1857. — The best determined period of revolution of a comet, exceeding in length the period of the comet which appears to be associated with the August stream of meteors, is that of the fourth comet of 1857, discovered by Prof. C. H. F. Peters at Albany, U.S., on July 18, by Dien, at Paris, on the 27th, and by Habicht at Gotha, and Donati at Florence on the 30th of the same month. It was observed with the great refractor at the observatory of Harvard College till October 21. These dates include an interval of from about one month before to two months after the perihelion passage, or an arc on the orbit of 145° . A very complete discussion of the observations was made by Dr. Axel Möller, whose masterly investigations relating to the motion of Faye's comet have led to such accurate prediction of its apparent track in the heavens at recent returns; the period he assigns is 234.7 years. A similarly rigorous calculation led Dr. Hans Lind to a revolution of 243.05 years, and there are ellipses of nearly the same length of period by other computers.

If we examine the path of this comet through the planetary system we soon discover that it passes near to the orbit of Venus. Employing the elements of Axel Möller, a strict calculation shows that in heliocentric ecliptical longitude $24^{\circ}54'$, the distance between the two orbits is less than 0.023 of the earth's mean distance from the sun. It may therefore be reasonably concluded that it is to an actual near approach of the comet to Venus about this point that the present form of orbit is due. The comet's perihelion distance is 0.747, the aphelion distance 75.35.

BIOLOGICAL NOTES

POCK-LYMPH. — The efficacy of pock-lymph has been attributed by several observers to the presence of small organisms of the nature of *Micococcus*. M. Hiller has recently studied this subject (*Centralblatt für d. Med. Wiss.*), and from 6,840 separate inoculations, he finds that the degree of activity of the lymph and the proportion of micrococci present do not correspond; on the one hand, the development of the organisms was often at its greatest when the action of the lymph was falling off, and on the other, lymph was often active, though no bacteria were perceptible in it. Fresh diluted lymph having been put in vertical tubes in a freezing mixture, and slowly thawed after freezing, the upper half gave on inoculation, 41.4 per cent. positive results, the lower half, 63.8 per cent. It appears from this that the poison is associated with the solid constituents more than with the liquid. Boiled lymph was, without exception, inoperative. The addition of 1 to $4\frac{1}{2}$ per cent. carbolic acid merely weakened the contagiousness of pock-lymph, while addition of glycerine left it unaltered. Strong dilutions weakened the action, while condensations exalted it; with evaporation, the percentage of favourable cases was increased about a half. In coagulated parts produced in the lymph, the active element was present in great quantity. Perfectly dried lymph is also active in high degree; hence we may infer that the communication of pox may occur by means of the crust and scurf of pustules which are rubbed off and float in the air. Inoculation with the blood of persons that were successfully inoculated proved inoperative; so also were the fresh contents of the bladders, seven days after inoculation. It is inferred that the cow-pox ferment is not contained in the blood, or not in the active state; and that very probably, also, the blood is not itself the seat of fermentation and reproduction of the poison.

ALGOID SWARM-SPORES. — If vessels of water containing algæ are placed in a room where they are lighted only on one

side, swarm-spores are generally found to collect at the side turned towards the window, more rarely on the opposite side. If they are present in considerable number, they often become arranged in peculiar cloudy forms; network, rays, tree-like branched figures, &c. The phenomenon has been frequently studied, and has been always regarded as an action of light, causing the living swarm-spores to move towards it or withdraw from it. After a long investigation of the phenomena, M. Sachs has come to a different conclusion. He considers that these groupings of zoospores are not phenomena of life, inasmuch as quite a similar process is found to occur with emulsions of oil in alcohol diluted with water; also that the light either does not at all participate in the action, or does so only indirectly, for all the phenomena may be reproduced in darkness. The accumulation of spores and the cloud-like figures are rather due to currents produced by differences of temperature in the water. M. Sachs's experiments are described in *Flora*, 1876, No. 16.

DISEASES GERMINATED IN HOSPITALS. — Several observers have remarked on the presence of globules of pus and microscopic algæ in the air and on the walls of hospitals. Some interesting facts of this order have recently been communicated to the French Société de Biologie, by M. Nèpveu of the laboratory of La Pitié. A square metre of the wall of a surgery-ward, having been washed, after two years without washing, the liquid pressed from the sponge (about 30 gr.) was examined immediately after. It was somewhat dark throughout and contained micrococci in very great quantity (fifty to sixty in the field of the microscope), some micro-bacteria, a small number of epithelial cells, a few globules of pus, some red globules, and lastly a few irregular dark masses and ovoid bodies of unknown nature. The experiment was made with all necessary precautions; the sponge employed was new, and carefully washed in water that was newly distilled. Facts like those referred to make it easy to comprehend how the germs of a large number of diseases occur in the air of hospitals, and how the latter may readily become centres of infection. The same conditions, though in less degree, may sometimes be met with in private life.

MARINE MOSSES. — M. Gissard lately showed to an audience at the Congress of learned societies at the Sorbonne, specimens of marine mosses growing on a madrepora placed in an aquarium, since January, 1872. They produce every year, in spring, phenomena of fructification, consisting of urns of a superb nacreous colour, growing at the ends of beautiful green filaments, then becoming detached and rising to the surface of the water. He cited the following fact as showing the vitality of certain marine plants. On May 13, 1875, a parcel of algæ which had been taken from an aquarium and dried several months in the sun, was placed in sea-water, and developed a magnificent green plant of ribbon form. In February and March, 1876, there were formed on the border of the ribbon sparse filaments carrying rounded urns of variegated colour, which became detached, and rose to the surface, giving rise to green plants.

NOTES FROM ST. PETERSBURG. — At the last meeting, October 18, of the Zoological Section of the St. Petersburg Society of Naturalists, Prof. Wagner gave some information as to his recent researches made in the Solovetsky Bay of the White Sea. The special aim of them was to throw some light on the causes which determine the use in certain organisms, as for instance the hydroids, of two different modes of reproduction, sometimes by gemmation, and sometimes with the help of special organs. Without coming to any decided conclusions (the researches having to be continued) M. Wagner pointed out, as one possible cause of this difference, the influence of different nutrition which generally so greatly influences the reproductive functions. M.

Cherniaffsky, who has been many years engaged in the study of the fauna of the Black Sea, and now studies especially the influence of the media on organic forms, reported upon his numerous collections of animals from various depths, and traced in them the slow variations which animals of the same species undergo at different depths, and the appearance of new species with the increase of depth; the labours of M. Cherniaffsky promise to be of great interest when published in full.

COLOURS OF ANIMALS.—At the last meeting of the St. Petersburg Entomologists' Society, October 16, M. Porchinsky reported upon some results on the exploration of a scientific party engaged last summer upon the exploration of the Caucasus. The southern limit of the region explored was the Steppe of Erivan, a plain covered with sand, with some patches of variously coloured clays appearing in the low hills. A remarkable feature of the animal inhabitants of the Steppe, insects and reptiles, and especially of the lizards, is the most perfect coincidence of their colouring with the colouring of the Steppe. The same thing was observed also in the Steppe of Elizabethpol. Interesting collections of the fauna made by the party were produced at the meeting.

NOTES

DR. CARL JELINEK, the eminent and accomplished meteorologist, died at Vienna on October 19, after a protracted illness.

THE death is announced, on the 16th ult., of Dr. von Watershausen, Professor of Mineralogy and Geology at Göttingen, where he was born in 1809. While young he travelled much, especially in Sicily and Iceland, making large mineralogical collections, which he presented to the university. He is specially known for his researches in connection with volcanic phenomena. During his later years he was engaged in a large work on the topography and orography of Etna.

PROF. H. J. S. SMITH'S valedictory address to the London Mathematical Society, on the 9th inst., will touch upon various points affecting the present state and prospects of pure mathematics.

THE popular German poet and mineralogist, Prof. von Kobell, has just celebrated, in Munich, the fiftieth anniversary of the day on which he was appointed extraordinary professor of mineralogy in that city.

DR. RÖNTGEN has been appointed extraordinary Professor of Physics in Strasburg University.

DR. CARPENTER, F.R.S., Secretary to the Gilchrist trust, has, for the special benefit of the Primary Teachers of the Metropolis, arranged for a course of lectures to be given by Dr. Richardson, F.R.S., at St. Thomas Charterhouse Schools, on Human Physiology, and its application to daily life. The course will be opened on Friday, November 3, by Dr. Carpenter, delivering an address on a Sound Mind in a Sound Body.

WILLIAM CLARKE MILLER, B.A. Lond., vice-principal of Huddersfield College, has been elected Registrar of the General Medical Council of Education in the place of Dr. Erasmus Hawkins, resigned. The new Registrar has been long known as an able mathematician.

It is stated by the *Medical Press and Circular* that the Goldsmith's Company has voted a sum of 1,000*l.* to the Chemical Society to aid in the formation of the fund to be devoted to the promotion of original research in the science of chemistry.

M. WADDINGTON, the intelligent Minister of Public Instruction in France, has come to a most liberal decision on behalf of the Paris Observatory. According to the standing financial rules

used in France, no adjudicator of works executed in the public interest is entitled to be paid except when his task has been completed and received. As an exception, M. Leverrier is authorised to pay in advance to the opticians and philosophical instrument makers a sum amounting to one-third of the total value.

THE Bischofsheim transit instrument, which has been so long delayed by the red-tapeism of the Finance Department, is almost finished, and observations will very shortly be inaugurated in the new pavillion which has been built on an improved scheme for its reception.

M. FEIL, the glass-worker of Paris, has just finished the casting of the crown-glass lens for the great Vienna refractor. The diameter is 28 inches and the weight 112 pounds. It will be sent immediately to Mr. Howard Grubb, of Dublin, who already possesses the flint lens.

THE course of lectures at the Sorbonne for candidates for the *licence* and pupils of the Normal Schools was opened a few days since. In former years the lecturers were confined to merely elementary subjects relating to mechanics, classics, astronomy, differential and integral calculus. But this year M. Bonnet lectures on the recent discoveries in high geometry, and M. Puisseux on a subject which has been largely discussed by men of science in England, the figure that the earth must have taken owing to its fluidity.

WITH exception of the schools of Paris, which rank among the first in the world, most of the faculties of sciences and *lettres* in France (says M. Grad in *La Nature*) have only five professors. Now there were a hundred and thirty-five at the University of Berlin, seventy at the University of Königsberg, against three hundred and forty-eight in all the faculties of the fifteen academical divisions of France in 1870. The faculty of sciences and that of *lettres* of Strasburg, more favoured than others, had then thirteen professors, against thirty-six in the faculty of philosophy and sciences of the present University. The University at present has a total of eighty professors distributed among the five faculties of theology, law, medicine, philosophy, and natural and mathematical sciences. This year Prussia devotes to the maintenance of its nine universities 6,577,397 marks, of which 4,820,841 marks are furnished from the State Treasury. With regard to population, the expenditure per head of inhabitants is 0.70 fr. in Alsace-Lorraine, 0.12 fr. in France, 0.33 fr. in Prussia.

A COMMITTEE appointed by the Russian Government at the St. Petersburg Medical Academy to investigate various proposed antiseptics and disinfectants, have arrived at the following conclusions:—1. Carbolic acid is the most efficient means against the development of ammoniacal gas, putrescence, and development of lower organisms in organic matter under decomposition, and it is therefore the best antiseptic. 2. Vitriol, salts of zinc, and charcoal, are the best means for deodorising matter under putrefaction. 3. The powders of Prof. Kitzary, besides the properties they share in common with other carbolic disinfectants, deserve attention because of the isolated state of phenol in them and their contents of quick-lime, which absorbs moisture—the principal condition of each kind of putrefaction—as also some part of the gases. 4. Chloride of lime and permanganate of potash quickly destroys the lower organisms in putrid liquids. 5. The disinfectants certainly retard the putrid processes in organic bodies, but their influence is only temporary, as a means of purifying air in dwellings their influence is very small if not totally nil, because of the very small degree of concentration of their ingredients that can be used without injuring the health of inhabitants. 6. For uninhabited buildings the best disinfectants are nitrous acid and chlorine.